## CLAIMS

## I/WE CLAIM:

- A modified α-glucosidase enzyme, the modified form differing from the wild-type barley α-glucosidase by proline being substituted at residue 340, the modified enzyme retaining activity at a higher temperature than the wild-type enzyme.
  - 2. A DNA sequence which encodes the expression of the enzyme of claim 1.
- 3. A transgenic host which expresses the DNA sequence of claim 2 to produce the modified barley  $\alpha$ -glucosidase.
- 4. A constructed DNA sequence including a protein coding region encoding a modified barley  $\alpha$ -glucosidase enzyme, the modified barley  $\alpha$ -glucosidase differing from the wild-type barley  $\alpha$ -glucosidase by the presence of a proline residue at residue 340.
  - 5. A transgenic host which expresses the constructed DNA sequence of claim 4.
- 6. A modified  $\alpha$ -glucosidase enzyme, the modified form differing from the wild-type barley  $\alpha$ -glucosidase by at least one amino acid substitution from the native barley  $\alpha$ -glucosidase enzyme sequence, the modified enzyme retaining enzymatic activity at a higher temperature than the wild-type enzyme.

- 7. A modified α-glucosidase enzyme as claimed in claim 6 wherein the modification is selected from the group consisting of removing an aspartate at residue 83, removing an aspartate from residue 92, adding a proline to residue 100, adding a proline and removing an aspartate at residue 101, removing an aspartate from residue 105, adding a proline to residue 122, adding a proline to residue 184, removing N-glycosylation site from residue 298, adding a proline to residue 336, removing an aspartate from residue 369, adding N-glycosylation site and removing an aspartate from residue 372, removing N-glycosylation site from residue 391, adding a proline to residue 394, adding a proline and removing an aspartate at residue 403, adding N-glycosylation site to residue 463, removing an aspartate from residue 508, removing a deamidation site from residue 568, adding N-glycosylation site and removing an aspartate from residue 694, adding a proline at residue 713, adding a proline at residue 742, and removing an aspartate from residue 764.
- 8. A DNA sequence which encodes the modified  $\alpha$ -glucosidase enzyme as claimed in claim 7.

- A method of making a mutant form of the enzyme barley α-glucosidase comprising the steps of:
- (a) constructing a mutant gene sequence encoding a mutant form of the  $\alpha\mbox{-glucosidase}$  enzyme;
  - (b) cloning the mutant gene sequence into an expression vector;
- (c) expressing the protein encoded by the expression vector to produce the protein encoded by the mutant gene sequence;
  - (d) recovering the protein produced; and
- (e) testing the protein for both  $\alpha$ -glucosidase activity and for thermostability; wherein the mutant gene sequence encoding a mutant protein has at least one mutation selected from the group consisting of removing an aspartate at residue 83, removing an aspartate from residue 92, adding a proline to residue 100, adding a proline and removing an aspartate at residue 101, removing an aspartate from residue 105, adding a proline to residue 122, adding a proline to residue 184, removing N-glycosylation site from residue 298, adding a proline to residue 336, removing an aspartate from residue 369, adding N-glycosylation site and removing an aspartate from residue 372, removing N-glycosylation site from residue 391, adding a proline to residue 394, adding a proline and removing an aspartate at residue 403, adding N-glycosylation site to residue 463, removing an aspartate from residue 508, removing a deamidation site from residue 568, adding N-glycosylation site and removing an aspartate from residue 694, adding a proline at residue 713, adding a proline at residue 742, and removing an aspartate from residue 764.